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ABSTRACT

The CC School project, which included 18 elementary students with deafness enrolled in the TRIPOD program within the Burbank (California) Public Schools, applied a personal video captioning technology in a workstation setting to a weekly writing experience that involved translating short American Sign Language video stories into written English captions. A typical workstation setup includes a personal computer, two video recorders, a character generator, and a video monitor. The equipment is configured to allow a student to watch a videotape, develop captions, and insert them at the appropriate place on the videotape. Students translated 40 stories over 2 academic years. The pilot project resulted in students demonstrating increases in fluency of writing and improvements in their knowledge of the structural properties of English. This led to a subsequent project in which personal captioning technology is being designed for students with different types of language-related learning needs. Six school programs (three serving students with deafness and three serving students with learning disabilities) are implementing the program to design and evaluate personal captioning experiences pertinent to the learners' needs. Goals for the 3-year project and planned activities for each of the 3 years are listed, emphasizing plans for implementing a computer communication network for electronic mail and conferencing. (Contains 10 references.) (JDD)

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Personal Captioning for Students with Language-Related Learning Needs

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Personal Captioning for Students with Language-Related Learning Needs

Since October 1991, there has been a cooperative effort between the CPB/WGBH National Center on Accessible Media (formerly Media Access Research and Development Office) and researchers at the National Technical Institute for the Deaf (NTID) at the Rochester Institute of Technology to examine the practical application of personal captioning technology for students with language-related learning needs. The initial personal captioning pilot project called CC School focused on elementary school students who are deaf. This project was collaboratively implemented with TRIPOD, a private, non-profit program for deaf children and their families operating within the Burbank Public Schools in California.

The CC School pilot project was an interactive personal captioning environment originally developed to help deaf children use their knowledge of American Sign Language (ASL) to improve their English language skills. The English language difficulty of learners who are deaf is well documented. Quigley and Kretschmer (1982) state that a child's capacity for linguistic development is severely limited without the benefit of interaction with a rich linguistic environment. However, children exposed to ASL from birth do not experience general language deprivation and they bring with them a language background in ASL to potentially help them in accessing, exploring, and assimilating the novel English language data that they are learning. Presumably, other deaf children who acquire fluency in ASL due to fairly early exposure (but not from birth), enjoy a similar potential heuristic benefit from ASL in further acquiring English.

Krashen (1985) observes that children tend to acquire both first and second language incidentally, without formal instruction, by exposure to "comprehensible input" and by focusing on the meaning of language rather than on its form.

Furthermore, Krashen emphasized that language programs need to be highly motivating and non-evaluative, requiring children to use language for communicative purposes without causing them to be consciously preoccupied with the language-learning enterprise *per se*. Consistent with this view, Neuman and Koskinen (1990) demonstrated that captioned television presents bilingual hearing children with a rich language environment that enables them to learn English words incidentally through context. In their study, captioned television provided better English vocabulary learning than television alone, text alone, or television and text separately presented.

Based on the knowledge of deaf students' ASL background and the need for them to practice and improve their English writing skills, the CC School project applied a personal video captioning technology in a workstation setting to a weekly writing experience that involved translating short ASL video stories into written English captions. There were a total of 40 stories that students translated over 40 weeks that spanned two different academic years.

The child-friendly captioning workstations were developed by WGBH. Each workstation (see Figure 1) included a DOS-compatible PC with color monitor where students composed and edited their captioned text. In conjunction, the videotaped material to be captioned was displayed on a separate color monitor and VHS VCR with search functions. A second VHS VCR and video caption decoder were used to combine the original video material with each student's captions after she or he was through with the composing and editing process. The student could then display their completed captions line-by-line onto a copy of the videotaped material by pressing a caption button on the keyboard as the video plays. This process could be repeated to correctly synchronize the captions with the video material. The computer software used for the captioning task was a custom revision of WPK-Word Processing for Kids. This unique configuration of computer and video technology resulted in a practical, cost-effective personal captioning environment that was effectively integrated into the existing computer writing lab of the school.

Briefly, the CC School pilot project involved eighteen deaf students (8-12 years of age) enrolled in the TRIPOD program – a "reverse mainstream environment" where hearing and deaf children are instructed in the same classroom by teachers using both signed and spoken language. All but one of the deaf children were skilled signers when this project started and their hearing loss ranged from severe to profound.

The two-year schedule of this pilot evaluation project enabled each of the 18 student participants to caption one ASL videotaped story per week for a total of 40 weeks that bridged two academic school years. Simultaneously, the students were provided with task specific instructional feedback for each of their weekly captioning activities.

A summary of the results of the CC School pilot personal captioning project is provided below:

- Teachers, administrators, and tutors expressed positive support and comments both about the workstation technology and the student's motivation, writing practice, and improvement.

- Students increased the length of their written captions, as well as writing more accurate ASL to English translations over the duration of this project.

- Students' use of function words and content words suggested growth in grammatical knowledge.

- Students' post-tests performance with a comparison group matched on age and level of hearing loss who did not participate in the CC School project indicated superior

knowledge of the traditional structures of English grammar by the CC School subjects.

Overall, the results of this pilot study show that the participating students demonstrated increases in fluency of writing throughout the project and that they made substantial improvements in their knowledge of the structural properties of English. The complete results and methodology of the CC School personal captioning pilot project are reported in detail elsewhere (see Kelly, Samar, Loeterman, Berent, Parasnis, Kirchner, Fischer, Brown, & Murphy, 1994).

In addition to the students' performance, an interesting development was the strong interest expressed by the participating TRIPOD teachers and administrators to acquire and explore this personal captioning technology beyond the translation process involving ASL to written English captions. This led WGBH and NTID to envision a project where teams of practitioners from different schools in the field would become central to designing and implementing learning activities pertinent to personal captioning technology for students with different types of language-related learning needs.

In follow-up to CC School, the current personal captioning project (three-year grant for the period September 1, 1993 to June 1996) was envisioned and designed as a fully collaborative project within each school, between schools, and of course, with the WGBH and NTID people. It involves teachers, support personnel and administrators within each respective school along with on-going collaborative support from NTID researchers and WGBH technical, support and administrative people.

There have been a number of recent studies of teacher attitudes toward computers and technology in the classroom and the factors that influence the successful implementation of technology. Generally these studies indicate that:

1. Teachers' attitudes toward technology become significantly more positive after they participate in projects that include external observation and support (Barufaldi & Davidson, 1991).

2. Qualitative methods substantially improve the validity and scope of the evaluation data obtained from quantitative instruments such as demographic questionnaires, anxiety scales, questionnaires about substantive concerns, etc. (Barufaldi & Davidson, 1991; Russek & Weinberg, 1991)

3. Computer technology promotes effective change in classrooms when certain conditions conducive to change are already in existence. These include:

    a) a shared vision of teaching and learning,
    b) leadership and support for the use of technology from school administrators,
    c) organizational conditions that allow teachers flexibility, time, and incentives to experiment with new instructional methods,
    d) opportunities for communication, interaction, and peer support over time for teachers
    e) training and personalized support over time for teachers. Computers by themselves do not serve as catalysts for change in the classroom (Foster, 1988; Kell, Harvey, & Drexler, 1990; Zorfass, Moracco, Tivnan, Persky, & Remz, 1991)

4. Effective implementation of computers in the classroom depends upon the empowerment of teachers to control the application of the technology. Teachers need to have opportunities to strike out in new directions on their own, and to actively search and assimilate existing computer research (Selfe, 1985; Zorfass, et al. 1991).

The current personal captioning project involves six school programs (three serving deaf students and three serving learning disabled students) in a cooperative implementation process that will include the design and evaluation of personal captioning experiences pertinent to the learners' needs in each of the respective schools. The six school programs are:

- American School for the Deaf in W. Hartford, CT
- Horace Mann School in Allston, MA
- CAPS Collaborative in Fitchburg, MA
- T.J. Connor School in Scottsville, NY
- Newton Public Schools in Newtonville, MA
- Carrol High School in Sudbury, MA

To facilitate and support the exchange of ideas and working relationships among these six school programs, as well as with the people involved from the WGBH National Center on Accessible Media and NTID, a computer communication network for both e-mail and conferencing will be utilized. The goal is to develop an ongoing think-tank relationship and dialogue among all the participants pertinent to the design and implementation activities for the personal captioning technology (refer to Figure 2).

A typical setup for a "Quickcaption workstation" is similar to CC School and includes a personal computer, two video recorders (one VCR for playback and one VCR for record), a character generator, and a video monitor (refer to Figure 1). This equipment is configured to allow a teacher to play any kind of videotape stimulus that the student can watch and then develop captions and insert them at the appropriate place on the videotape (Note, the captions are not put on the original videotape, but rather on a copy that the student or teacher can keep).

The objectives of this three-year personal captioning project are:

1. To introduce an innovative personal captioning technology to schools and programs for students with language-related learning needs.

2. To encourage school personnel to:

    a) Explore uses of this personal captioning technology that best address their educational goals and student-centered objectives.

    b) Collaborate within their schools, with other project schools, and with project staff in applying the technology and designing the research.

3. To measure changes in student performance as a result of using the personal captioning technology.

4. To examine and develop an understanding of how school personnel implement a multimedia technology and to document factors that facilitate or impede successful implementation:
    a) In integrated (mainstream) and separate settings.
    b) With students who are deaf and those with language-related learning disabilities.

5. To foster an on-going exchange of ideas among all the participating schools, as well as with WGBH/NCAM and NTID.

6. To disseminate the findings and techniques to a broad audience of general and special education teachers, administrators and researchers through various media, including production of a short

videotape documentary.

In addition, an overview and highlights of the activities per each of the three years of this project are provided below.

First year 1993/94

- Each school will receive two personal captioning workstations.
- They will utilize the initial year to try out the equipment and pilot teachers' ideas and materials.
- Design, development, and implementation questions, ideas, and issues will be discussed and shared among all the schools.
- By the end of the year, each school will have identified at least one project (or more) to fully develop and implement in the second and third years.
- As each school's projects are identified, they will work with NTID researchers to design a related research study.
- Ethnographic information will be collected via interviews with participating teachers and administrators to obtain their perspectives on the try-out, design, and development processes.

Second year 1994/95:

- Each school will implement their respective projects.
- Student performance data will be collected as part of the

- Student performance data will be collected as part of the implementation appropriate to each respective school's project as per their research design.

- On-going exchanges of ideas, questions, issues, and projects will continue via computer communications, site visits, and a year-end meeting, etc.

- Interviews will again be conducted with the participating teachers and administrators pertinent to their perspectives of the implementation processes.

Third year 1995/96:

- Schools will continue to implement new and/or continuing projects.

- NTID researchers will analyze data and prepare research reports on each project working with the participant teachers on the interpretations – and implications of the results.

- WGBH and NTID will prepare an overall evaluation report of this three-year project including the ethnographic information.

- WGBH and NTID will implement information dissemination as outlined in the grant proposal.

As a result of the collaborating team approach used in the current grant, the probability is increased that practical and innovative personal captioning activities with clear evaluation documentation will be developed to meet student needs within the

context of the curriculum in each of the six participating schools. Central to the development and implementation process for the innovative personal captioning technology is the focus on the teacher as the development leader with appropriate team support from administrative, technical, and research personnel. The computer communication network is key to maintaining an on-going dialogue, exchanging ideas, and developing a think-tank relationship among all the participants.

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Figure 1

Setup of a Typical
QUICKCAPTION WORKSTATION

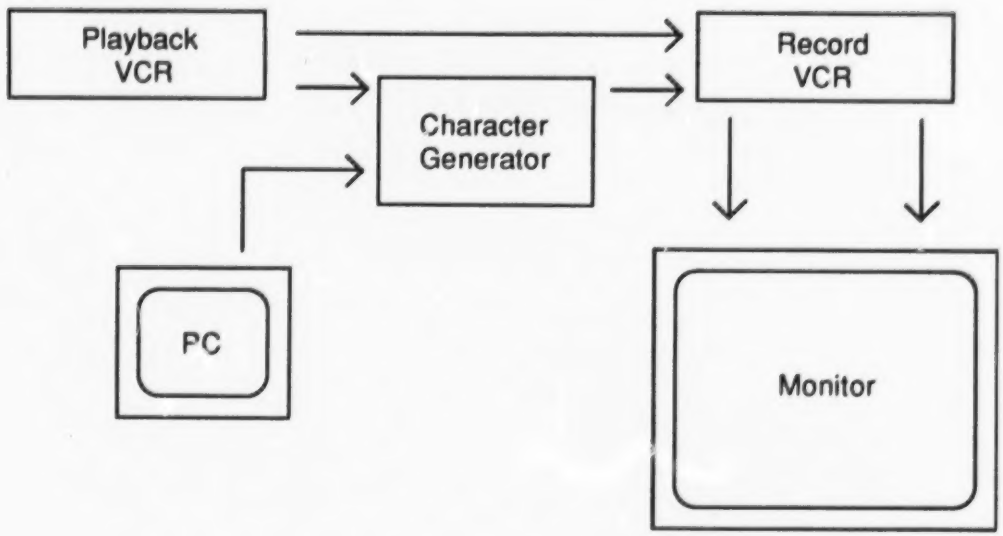

Figure 2

COMPUTER COMMUNICATION NETWORK FOR ROUTINE COMMUNICATIONS, EXCHANGING IDEAS, AND DEVELOPING A THINK-TANK RELATIONSHIP AMONG THE PARTICIPATING SCHOOLS